

STATE OF CALIFORNIA  
AIR RESOURCES BOARD  
P.O. Box 2815  
Sacramento, CA 95812

July 2000

## **REQUEST FOR PROPOSALS**

### **Collection of Evaporative Emissions Data from Off-Road Equipment**

The Air Resources Board (ARB) reserves the right to reject any proposal deemed nonresponsive to the RFP, not responsible, and/or not reasonable. These terms are defined in the Glossary (Appendix XII).

Proposals submitted under this RFP will be evaluated by the “secondary” method. In the secondary method, the contract award is based on the highest score given to a proposal by an evaluation committee using the established rating criteria (Table 6). The cost of the proposed research is the highest weighted criteria, although not the determining factor. This means that the lowest cost bid will not necessarily be awarded the contract.

### **I. OBJECTIVE**

The objective of this study is to collect evaporative emissions data from gasoline powered off-road equipment, for inclusion in the Air Resources Board’s (ARB) emissions inventory model, OFFROAD (ref. 1). This project will require the evaporative emissions testing of off-road equipment from various categories for the following evaporative processes: diurnal/resting loss emissions, hot soak emissions, and evaporative running loss emissions. Since there are no defined procedures to test off-road equipment for evaporative emissions, the data will be collected in the manner outlined in this Request for Proposals (RFP). These procedures are borrowed from on-road test procedures and, thus, bidders must have an in-depth knowledge of on-road vehicle evaporative emissions testing and have, at their disposal, a fully

operational evaporative emissions testing facility, capable of housing the equipment type specified in this RFP. In addition, bidders should be experienced in emissions testing methods for on-road equipment and must also demonstrate that they will make the time and resource commitments necessary to successfully manage the day-to-day tasks of this project. It should be stressed that the contractor will be expected to use pre-existing on-road evaporative emissions test procedures as the starting point for evaporative emissions testing (e.g., use of a SHED, engine warm up, etc.), but will also be expected to develop and implement modifications to these test procedures to account for differences between automobiles and off-road equipment (e.g., lawnmowers and other equipment types are not expected to be operated on a dynamometer prior to undergoing diurnal or hot soak evaporative emissions testing, etc.).

## **II. BACKGROUND**

With the adoption of recent exhaust emissions regulations involving several off-road equipment categories, such as pleasure craft and small and large off-road engines, the off-road equipment contribution to the California emissions inventories has been significantly reduced. As a result, the relative contribution from evaporative emissions (defined as reactive organic gases [ROG]) from off-road equipment has increased as a percent of the total emissions inventory. At present, the emissions inventory for gasoline off-road evaporative emissions is not comprehensive. This is because gasoline off-road equipment has not been extensively tested for evaporative emissions and, thus, emissions data for these equipment categories are limited. Estimates based on recent emissions testing of gas cans have shown that fuel containers can be a significant contributor to the ROG emissions inventory (about 86 tons per day) and serve as an analog for uncontrolled fuel tanks on off-road gasoline equipment/engines and their possible emissions contribution.

Evaporative emissions are defined as consisting of four processes: diurnal and resting losses/permeation, running losses, and hot soak emissions. Diurnal emissions occur due to the daily ("diurnal") ambient temperature change that causes fuel evaporation from fuel tanks as the ambient temperature increases during the day. Diurnal

emissions are modeled as occurring when the equipment is idle (i.e., not being used). Resting losses, like diurnal emissions, occur when equipment is idle, but are caused by permeation through rubber, plastic, or metal components rather than normal daily temperature excursions. Resting losses and diurnal emissions can be thought of as complementary processes and are typically measured during the same emissions test. Running losses are evaporative hydrocarbon emissions that emanate from the engine and fuel system when the engine is running, and are separate from exhaust emissions. Hot soak emissions occur when the fuel in the fuel system heats up after a hot engine is turned off.

The following table lists the largest categories, in terms of population, for gasoline off-road equipment.

Table 1. Largest segments of the gasoline-powered equipment population in the OFFROAD model by category

<b>Category</b>	<b>Equipment Description</b>
<b>Lawn &amp; Garden</b>	Lawnmower, trimmer, leaf blower, chainsaw
<b>Marine</b>	Vessel with outboard engine, vessel with stern drive engine, personal watercraft
<b>Recreational Vehicle</b>	Motorcycle, all terrain vehicles (ATVs), specialty vehicles
<b>Commercial</b>	Generator, pump, welder, pressure washer

The goal of this project is to collect evaporative emissions test data under real-world conditions to estimate California's off-road equipment evaporative emissions inventory.

### **III. SCOPE OF WORK**

This project will consist of four major tasks:

1. Equipment selection and procurement.
2. Fuel procurement.
3. Evaporative (and exhaust) emissions testing.
4. Final report.

## **TASK 1. EQUIPMENT SELECTION AND PROCUREMENT**

Based on equipment population, the largest contributors of evaporative emissions are lawn and garden equipment, marine, recreational vehicles, and light-duty commercial equipment. The contractor shall test the following equipment for evaporative emissions:

Table 2. List of Equipment for Evaporative Emissions Testing

<b>Category</b>	<b>Equipment</b>	<b>Number to Procure</b>
<b>Lawn &amp; Garden</b>	Lawn Mowers	6
<b>Lawn &amp; Garden</b>	Trimmers	5
<b>Marine</b>	Marine Outboard Engine	4*
<b>Marine</b>	Personal Water Craft (Jetski)	4*
<b>Marine</b>	Marine Sterndrive Engine	4*
<b>Recreational Vehicle</b>	Motorcycles	4*
<b>Recreational Vehicle</b>	ATV's	4*
<b>Lawn &amp; Garden</b>	Leaf blowers	3
<b>Lawn &amp; Garden</b>	Chainsaws	3
<b>Light-duty Commercial</b>	Generator Sets	3*
<b>Total</b>		40

NOTE: Equipment marked with an asterisk(\*) shall be procured by the contractor.

All equipment must be approved by ARB staff prior to procurement for testing.

Equipment to be tested shall represent a mix of old and new equipment, residential versus commercial equipment (pertaining to lawn & garden equipment), from several manufacturers, and have fuel tanks of differing materials (such as plastic or metal).

ARB will provide the lawn and garden equipment (total of 17 pieces of equipment) for testing. Bidders shall include the cost of shipping the lawn and garden equipment from El Monte to their testing laboratory and return in their cost proposals. The contractor shall procure the remaining equipment (listed in Table 3). To the extent possible, the contractor shall determine and record the history (e.g., date purchased, estimated hours of use, etc.) of the equipment procured. The models of off-road equipment procured should be "popular" models that are well represented in the in-use population.

By state regulation, all equipment purchased as part of this contract becomes the property of the State of California. The ARB does not desire to own the off-road equipment procured as part of this project; therefore, bidders are discouraged from

purchasing equipment listed in Table 3. Bidders should consider equipment rental or lease as the preferred procurement option. If purchase and resale of equipment is the most cost-effective method for procuring equipment, the bidder shall provide explicit justification for this method in their cost proposal. ARB staff will be reviewing emissions data within days of testing (to determine which pieces of equipment will need to undergo replicate tests); therefore, the selected contractor shall not be required to retain the equipment for the entire duration of the study.

Table 3. Equipment Procurement List

Equipment Category	Equipment Type	New Post-1999		Old Pre-1995	
		Make 1	Make 2	2-Stroke Engine	4-Stroke Engine
<b>Marine</b>	Marine Outboard Engine	1	1	1	1
<b>Marine</b>	Personal Water Craft	1	1	2	0
<b>Marine</b>	Marine Sterndrive Engine	1	1	0	2
<b>Recreational Vehicles</b>	Motorcycles	1	1	1	1
<b>Recreational Vehicles</b>	All Terrain Vehicles (ATVs)	1	1	1	1
<b>Light-duty Commercial</b>	Generator Sets	1	0	1	1
<b>Total</b>		6	5	6	6

In their cost proposal, each bidder shall specify the cost of procurement for each piece of equipment.

## **TASK 2. FUEL PROCUREMENT**

All equipment shall be tested on a commercially available (i.e., pump fuel), "market-basket blend" (i.e., three different fuels splash-blended together) of California summertime gasolines available at the time of testing. The three fuels shall each be analyzed individually before blending to determine fuel compositions, and results reported to ARB staff before proceeding. Uncertainties regarding future fuel specifications (e.g., oxygenates, etc.) preclude more definitive guidance regarding the exact type of fuels to be procured. This guidance is not currently available, but will be provided to the contractor prior to fuel procurement.

In addition, a subset of up to ten (10) pieces of equipment shall be tested using one additional gasoline such as California Reformulated Gasoline, Phase Three (CaRFG3). The contractor shall estimate the total volume of fuel needed to complete the entire testing program and procure that amount in two single batches. Specifications for currently available commercial fuel (i.e., California Phase 2 Gasoline) are attached as Exhibit A. Final specifications, similar to Exhibit A, for both fuels will be provided to the contractor before the start of the contract. The contractor shall also send samples of the fuels to ARB's fuel analysis laboratory in El Monte. It is the contractor's responsibility to ensure that the two fuels procured are within specifications and, if any fuel procured is not acceptable, take all steps necessary to obtain fuel that does meet specifications.

From the single batch of the three fuels procured and splash-blended, fuel samples shall be analyzed at the beginning, middle, and the end of test program to ensure the stability of the test fuel. The contractor shall perform a total of six fuel analyses (three per fuel) and provide six additional samples to the ARB for separate analyses. The fuel parameters for analysis are listed in Exhibit A. It shall be the contractor's responsibility to store the fuel under conditions that ensure that the various fuel properties do not degrade over the duration of the test project.

### **TASK 3. EVAPORATIVE AND EXHAUST EMISSIONS TESTING**

#### **Introduction**

All equipment shall be tested for diurnal/resting loss and hot soak emissions, using the test procedures and equipment that are either similar to, or the same as used for, on-road evaporative emissions testing. Running loss tests shall be performed on a subset of five pieces of equipment, as approved by the ARB. No running loss tests shall be performed on marine equipment. There are no recognized/approved evaporative emissions test procedures for off-road equipment. Therefore, the contractor shall adhere to on-road testing procedures as much as possible and shall deviate from those procedures only to accommodate unique characteristics of off-road equipment, such as their size or design. For example, in order to perform a running

loss test, the off-road engine, together with its fuel tank assembly, must be removed and mounted on an engine dynamometer.

The bidders shall identify the sealed housing for evaporative determination (SHED) laboratory to be used to test off-road equipment. Equipment that collects evaporative emissions must be able to collect and report data electronically, on a minute-by-minute basis. The emissions test facility must currently be fully operational. Bidders must submit an example of a recent emissions test that has been performed at the proposed facility. The laboratory must demonstrate the capability of measuring and reporting hydrocarbon emissions for all processes. Bidders must submit names of the contact persons at the test facility.

### **Specific Test Guidelines**

All test data (i.e., equipment description, equipment inspection, and emissions test data) shall be submitted to ARB staff for review and approval after the first piece of equipment is procured and tested, and on a per-equipment-tested basis.

1. After procuring the equipment, the contractor shall fill out an equipment description sheet with details, such as make and model year, material and size of the fuel tank, and horsepower rating of the equipment. In addition, the contractor shall perform and document a detailed inspection of the equipment and note such things as the condition and location of fuel tank, fuel lines, fittings, etc. The contractor shall follow and check each item in the equipment description and diagnostic sheet. An example of a equipment description sheet is attached as Exhibit B. After consultation with ARB staff, the contractor shall finalize this sheet and electronically store the information included in the equipment description and diagnostic sheet in a format approved by ARB staff. This electronic database is a deliverable at the end of the contract. The contractor must not repair any old equipment or replace any components without prior authorization from the ARB staff.
2. If the equipment is a two-cycle engine, the bidder shall determine the Reid Vapor Pressure (RVP) of the fuel after it is mixed with manufacturer's specified proportion of oil.

3. The test data collected shall be minute-by-minute data.
4. For the initial test, the fuel tank shall be drained and filled to 50 percent of its manufacturer-recommended maximum fuel level, with the fresh fuel procured by the contractor. When performing subsequent weekly tests for fuel weathering effects on the two selected pieces of equipment, the fuel shall not be drained or added to the fuel tank. Where possible, the original fuel in the fuel tank shall be saved for a fuel analysis, to measure the effects of fuel weathering.
5. Prior to beginning emissions testing, the contractor shall prepare and submit a test plan for ARB staff approval.

## **SUBTASKS FOR EMISSIONS TESTING**

### **DIURNAL/RESTING LOSS EMISSIONS TEST**

The diurnal emissions test shall be for 24 hours, using a typical summertime temperature profile. The profile will be provided by ARB and shall be followed within a tolerance of +/- 2 degrees Fahrenheit (°F). In the diurnal emissions testing, the ambient temperature within the SHED shall be cycled instead of using a heating blanket. ARB staff may provide two different temperature profiles for the lawn and garden equipment. One profile will be for commercial equipment and the other for residential equipment. The residential profile reflects equipment storage in a sheltered environment, such as a garage, while the commercial profile reflects a more open environment, such as the bed of a pickup truck. An example of a typical 24-hour period temperature profile used in the diurnal emissions testing is shown in Exhibit C. In order to provide contractors with flexibility, two test sequences are listed below. Each bidder shall specify the method (A or B) to be used in their proposal and their test plan.

#### **Method A - Diurnal Test first**

- Day One
  - 1) Drain and refill fuel tank.
  - 2) Precondition - 15 minutes at rated speed.
  - 3) Overnight soak at 68-86°F.
- Day Two



- 1) 24-hour diurnal/resting loss emissions test.
- Day Three
  - 1) Precondition engine outside SHED.
  - 2) Three-hour hot soak.
  - 3) Quality assurance/quality control (QA/QC) of emissions and other data.
  - 4) Report results to ARB staff.

#### Method B - Hot Soak Test first

- Day One
  - 1) Drain and refill fuel tank.
  - 2) Precondition - 15 minutes at rated speed.
  - 3) Overnight soak (12-36 hours) at 68-86°F.
- Day Two
  - 1) Engine warmup - 15 minutes at rated speed.
  - 2) Engine hot soak for three hours - ambient temperature of 95°F.
  - 3) Forced engine cool-down to diurnal test start temperature.
  - 4) 24-hour diurnal/resting loss emissions test.
- Day Three
  - 1) QA/QC of emissions and other data.
  - 2) Reporting of results to ARB staff.

#### **Hot Soak Emissions Test**

The hot soak test shall be three hours in duration, performed at a nominal ambient temperature of 95°F (see A and B above). The engine shall be started outside of the SHED, run for fifteen minutes, and then placed in the SHED and allowed to soak for a period of three hours.

#### **Running Loss Emissions Test**

In addition to evaporative running loss emissions, exhaust emissions shall also be collected, including total hydrocarbons, carbon monoxide, oxides of nitrogen, total particulate matter, and carbon dioxide, and shall be reported in grams per horsepower hour. If a running loss test is being performed on a piece of equipment, it shall be the first test performed. No preconditioning is required if the hot soak is followed

immediately after the running loss test. If the hot soak test cannot be performed immediately after the running loss test, the contractor shall describe how the engine will be preconditioned. All running loss tests shall be performed at 95°F. After the hot soak emissions, diurnal/resting loss emissions shall be measured.

The specific procedure is as follows:

- Day one
  - 1) Drain and refill fuel tank.
  - 2) Precondition - 15 minutes at rated speed.
  - 3) Overnight soak at 68°-86°F.
- Day two
  - 1) Perform ISO test cycle on selected engine.
  - 2) Three-hour hot soak.
  - 3) Forced cool down to diurnal start temperature.
  - 4) 24-hour diurnal/resting loss emissions test.
- Day three
  - 1) QA/QC of emissions and other data.
  - 2) Report results to ARB staff.

The following equipment types have been selected for running loss emissions testing: lawnmower, string trimmer, generator set, motorcycle, and all terrain vehicle.

The following ISO test cycles shall be used during the running loss test:

- G2 and G3 steady-state tests (Lawn and Garden).
- D2 steady-state test cycle (Light-duty Commercial).
- On-road certification cycle (FTP) (Motorcycle).

NOTE: These test cycles require the use of an engine dynamometer. Bidders shall state how they will ensure that their test setup will accurately simulate the fuel tank placement on the actual piece of equipment. If the engine on a particular piece of equipment can be properly exercised without removing the engine from the equipment and mounting it on an engine dynamometer, bidders are encouraged to propose such a

method. For example, if a portable generator can provide the engine load in a manner that is representative of the real-world behavior and/or the ISO test cycles, then this should be proposed. Bidders are required to propose a minimum of five pieces of equipment for running loss testing, but may propose and justify alternatives to the equipment listed above (i.e., lawnmower, string trimmer, generator set, motorcycle and ATV) if these equipment types cannot be tested in a cost-effective manner.

### **Fuel Level Testing**

Four pieces of equipment will be emissions tested at three different fuel fill levels: 25 and 75 percent of maximum, and maximum fill level. This will result in total of 12 tests each for hot soak and diurnal. No running loss emissions tests will be performed.

### **Refueling Emissions**

Ten pieces of equipment shall be refueled while inside the SHED to measure refueling emissions. The specific equipment types and exact protocol will be provided to the contractor before emissions testing begins. For bidding purposes, the contractor can assume that the refueling process will require a total of one hour for actual equipment refueling and emissions measurements.

### **Fuel Weathering**

Hot soak and diurnal/resting loss emissions tests shall be repeated on four pieces of equipment every week for four weeks to assess the effect of fuel weathering, using CaRFG2 gasoline. The four units tentatively selected for fuel weathering testing are from the lawn and garden and marine equipment categories. Exact specifications will be provided subsequent to initiation of the contract. Fuel samples shall be tested for the RVP before the initial and after the final test of fuel weathering effects (two fuel samples and analyses).

### **Fuels Comparison**

A total of six pieces of equipment shall be tested for diurnal/resting emissions and hot soak emissions using the CaRFG3 fuel for comparison with the CaRFG2 results. Each

piece of equipment will be given an initial test, plus 1 replicate. This means that the six pieces of equipment tested for the fuels comparison using RFG2 will also undergo two tests (this will bring the total number of diurnal/resting loss tests to 46). ARB staff will specify the equipment types prior to the beginning of emissions testing. Only diurnal/resting loss emissions and hot soak emissions will be measured.

### **Testing with Emissions Control Devices**

A total of ten pieces of equipment shall be tested with emissions control devices in place. ARB will select the specific type of equipment and the type of emissions control device to be used.

### **Replicate Tests**

After reviewing the initial test data collected from each of the 40 pieces of equipment, ARB staff will specify replicate tests on ten different equipment types, to estimate the variability of the data. The particular engines/equipment selected for emissions testing will be identified within one week of emissions testing of that particular engine/equipment. These tests will consist of the entire evaporative test sequence (without running loss test). These replicate tests are in addition to the fuels comparison replicate tests.

### **Sample Speciation**

The contractor shall collect samples for speciation using ARB-approved methods. Specifically, the contractor shall collect six to eight samples from two-stroke engines and four to six samples from four-stroke engines in canisters that shall be turned over to ARB staff who will perform sample speciation.

### **Quality Assurance/Quality Control**

The bidder shall specify what measures will be taken to ensure the quality and accuracy of the data collected. This includes a description of routine laboratory test procedures, instrument checks, and calibrations, as well as measures that will be taken to ensure sample integrity for the speciated data.

## Summary

In summary, the following table lists the number of tests that shall be performed by the contractor.

Table 5. Test Matrix

<b>Fuel</b>	<b>Diurnal/Resting Losses</b>	<b>Hot Soak</b>	<b>Running Losses*</b>
<b>Commercial CaRFG2</b>	46	46	5
<b>Fuel Level Testing</b>	12	12	-
<b>Refueling Emissions</b>	10	-	-
<b>Fuel Weathering</b>	16	16	-
<b>Fuel Comparison</b>	12	12	-
<b>Testing w/Emission Control Devices</b>	10	10	-
<b>Replicate</b>	10	10	-
<b>Total</b>	116	106	5

\*Bidders may propose a fewer number of tests depending on each bidders costs given the project budget. However, bidders may not propose a test program without running loss tests, although as noted on page 11, bidders may propose (and must justify) alternatives to the equipment specified on page 11. It should be noted that, in the event that some bidders propose more tests than other bidders, bidders proposing more tests will be rated as more responsive in this regard.

## TASK 4. FINAL REPORT

The contractor shall prepare a draft final report for submission to ARB staff at least three months prior to contract completion. The final report shall include a description of all equipment procured and emissions-tested; emissions data, presented in summary tabular form; and analysis of fuel-specific (i.e., CaRFG2 and CaRFG3) emissions. For running loss emissions, the final report shall describe the test cycles and graphically illustrate the duty cycle (i.e., speed and load versus time traces). The final report shall also include a description and discussion of any and all anomalous results including fuel specifications, test results, and replicate tests.

## IV. OTHER PROPOSAL REQUIREMENTS

To be considered for the contract, all proposals responding to this RFP must fulfill the requirements in the Proposal Submittal Requirements (Appendix II). In addition to evaporative emissions measurements, bidders shall also include descriptions of their off-road engine emissions testing capabilities.

## **V. MEETINGS**

### **1. INITIAL MEETING.**

Prior to the start of any contract work, the principal investigator and key personnel shall meet with the ARB contract manager and other ARB staff in El Monte, California, to discuss the overall plan, details of performing the tasks, the project schedule, items related to personnel or changes in personnel, and any issues that should be resolved before work can begin.

### **2. PROGRESS REVIEW MEETINGS.**

The contractor and appropriate members of his or her staff shall meet with the ARB contract manager for up to five additional meetings in El Monte, California, at approximately quarterly intervals, to discuss the progress of the project.

## **VI. CONTRACT DELIVERABLES**

### **1. INVOICES.**

The contractor shall submit an original and one copy of monthly invoices in triplicate. The invoice shall itemize all expenses incurred during the payment period completed. Each item in the invoice shall correspond to one of the numbered items in the Budget Summary (page 2 of the Budget Submittal Form, Attachment 5). Direct labor charges and subcontractor and consultant charges should be subdivided into number of hours spent by each staff classification (e.g., Senior Scientist, Research Assistant) for the invoice period. The contractor's fee should be billed as a percent of the invoice total.

Invoices should be submitted to:

Ms. Emma Plasencia  
Air Resources Board  
Research Division  
P.O. Box 2815  
Sacramento, California 95812

The contractor will not be paid for the payment period completed unless the invoice and a progress report satisfying the requirements in Item 2 below have been submitted to the Contracts Administrator and are deemed by ARB staff to reflect reasonable work done in accordance with the contract.

2. PROGRESS REPORTS.

The contractor shall provide progress reports on a quarterly basis. With respect to the payment period completed, the contractor shall forward to the Contracts Administrator, Emma Plasencia ([eplasenc@arb.ca.gov](mailto:eplasenc@arb.ca.gov)), an electronic copy of the progress report along with each invoice. The progress report should be produced in Microsoft Word® (preferred), Wordperfect® or in PDF format.

Each progress report will include:

- (a) A brief narrative account of project tasks completed or partially completed since the last progress report. The task names must match those in Section III of this RFP, "Scope of Work".
- (b) A brief discussion of problems encountered during the reporting period and how they were or are proposed to be resolved.
- (c) A brief discussion of work planned, by project task, before the next progress report.
- (d) A graph showing allocation of the budget and amount used to date for each task (see Example D).
- (e) A graph showing percent completion for each task (see Example E).

If the project is behind schedule, the progress report must contain an explanation of the reasons and discuss how the contractor plans to resume the schedule.

3. DRAFT FINAL REPORT.

Ninety days prior to the contract termination date, the contractor will deliver 20 bound copies of a draft final report and one electronic copy on a 3.5" diskette(s) or CD (produced with Microsoft Word® [preferred] or Wordperfect®) to the ARB, for review by ARB staff. The printed reports may be stapled or spiral bound, depending on size. *The draft final report will conform to the Research Contract Final Report Format, Appendix VII.*

Within 30 days of receipt of ARB's comments on the draft final report, the contractor shall deliver to the contract manager two copies of the final report incorporating alterations and additions requested by the ARB.

4. FINAL REPORT.

Upon approval of the amended final report by the contract manager, the contractor shall deliver to the ARB within two weeks, two camera-ready *unbound* originals and 10 spiral-bound copies of the final report incorporating all final alterations and additions. Do not add a company cover to the bound copies; the title page should be the first visible page. The contractor shall also deliver two electronic copies of the final report on a 3.5" diskette(s) or CD, one produced with Microsoft Word for Windows 95<sup>®</sup> (preferred) or Corel<sup>®</sup> WordPerfect<sup>®</sup> and one in PDF format. *The final report shall conform to the Research Contract Final Report Format, Appendix VII.*

5. DATA COMPILATIONS.

Together with the final report, the contractor shall deliver a set of all data compilations as specified by the contract manager.

## VII. FUNDING

Funding for a cost-reimbursable contract, with an amount not to exceed \$300,000, has been allocated for this project. A cost-reimbursable contract is one in which the



contractor's costs are reimbursed by ARB at specified intervals, upon completion of the work required for that period. The interval for this contract is quarterly.

Only those costs actually incurred by the contractor and appearing on the invoice for the billed period will be reimbursed. No reimbursement will be made for invoices that, in the judgment of ARB staff, do not comply with the requirements of the contract. Under no circumstances will ARB reimburse the contractor for costs exceeding the contract award.

### **VIII. TIME ALLOWED**

*Allow at least 150 calendar days for the entire evaluation process of your proposal by ARB and the California Department of General Services.*

A period of up to 30 months will be allowed for completion of all work on the project and submittal of the draft final report. An additional three months will be allowed for ARB staff review of the draft final report, incorporation of any necessary revisions by the contractor, and submittal of the final report.

### **IX. CONFIDENTIAL INFORMATION**

All proposals received by the State are public records and will be available for review by the public at the ARB Research Division office. Proposals containing information the bidder requires to be kept confidential will be rejected as nonresponsive.

### **X. CONTRACT PROVISIONS**

The successful bidder, upon accepting the award, shall be required to enter into and sign a contract that incorporates certain contract provisions. These include the State Standard Agreement (Appendix V), the ARB's Standard Agreement Provisions (Appendix VI), the Research Contract Final Report Format (Appendix VII), and other contract provisions (Appendices VIII through XI). Contract provisions are not negotiable. If your proposal represents a counter-offer changing the terms of the RFP or the contract provisions, it will be rejected as nonresponsive.

## **XI. ATTACHMENTS, EXAMPLES, AND APPENDICES TO THIS RFP**

This RFP is accompanied by the following documents:

**Attachments 1-6.** *All of these must be completed and returned to ARB with the proposal.* Attachments 1-4 must be submitted in the Administrative Documents packet. Attachments 3 and 4 are required only if you are claiming the target area and/or enterprise zone preference, respectively. Attachment 5 must be submitted in the Cost Proposal packet. Attachment 6 must be submitted in the Technical Proposal packet.

**Examples A-E.** These are *samples* to follow when composing documents required in the proposal (Examples A-D) or in fulfillment of the contract (Example E).

**Appendices I-XII.** These are for your information. *They are not to be returned with the proposal.* Appendices I through IV are designed to help you prepare and submit your proposal. Appendices V through XI will be incorporated into the contract. Appendix XII is a Glossary of terms used in this RFP.

***It is the bidder's responsibility to see that his or her copy of the RFP has all the Attachments, Examples, and Appendices. Please check your copy. If any are missing, call Emma Plasencia at (916) 323-1524.***

**Table 6**  
**RATING CRITERIA**  
**for**  
**Collection and Analysis of Evaporative Emissions from Off-Road Equipment**

<b>RATING CRITERION</b>	<b>MAXIMUM POINTS POSSIBLE</b>
1. Technical approach and work plan, including understanding of the problem	20*
2. Previous related experience with evaporative emissions testing and off-road equipment	10**
3. Availability of facilities for evaporative emissions testing, including evaporative running losses and dynamometers for simulating engine loads.	10**
4. Level and quality of effort to be provided, including project management plan	20*
5. QA/QC plan	10
6. Cost	30
<b>TOTAL SCORE</b>	<b>100</b>

A proposal must have a total score of at least 85 points to be qualified for consideration for this contract.

\*Proposals receiving less than 16 points for this criterion will not qualify for further consideration.

\*\*Proposals receiving less than 8 points for this criterion will not qualify for further consideration.

The following criteria will be used by reviewers evaluating proposals submitted in response to this RFP. The review panel will include but may not be restricted to ARB staff.

After studying the RFP, each panel member will review each proposal and assign points for each criterion discussed below. The reviewers will then meet, either in person or by teleconference, to discuss in detail the strengths, weaknesses, and ratings of each proposal. After this discussion, reviewers may revise their criteria scores. After revision of criteria scores, the reviewer's scores for each criterion will be averaged for each proposal (reviewer's scores will be given equal weighting). All of a proposal's averaged criteria scores will be added to give that proposal's total score.

1. *Technical approach and work plan, including understanding the problem* (20 points).

This criterion has a minimum qualifying score of 16 points; that is, proposals rated below 16 points for this criterion will be considered nonresponsive and will be eliminated from further consideration. The purpose of this criterion is to provide bidders the opportunity to demonstrate their knowledge in the subject of the RFP and to lay the groundwork for the actual work to be performed for this project. This portion of the bidder's proposal should spell out, in adequate detail, exactly what the bidder proposes to do to satisfy the requirements of the RFP. Also, as part of the criterion, bidders should demonstrate their understanding of the questions, or needs, that ARB is seeking to have addressed. The technical approach and workplan are considered the heart of the proposal and will receive a high level of scrutiny. This part of the proposal will be compared against the RFP to ensure that all specified tasks and deliverables are responsive.

2. *Previous related experience with evaporative emissions testing and off-road equipment.* (10 points). This criterion has a minimum qualifying score of 8 points; that is, proposals rated below 8 points for this criterion will be considered nonresponsive and will be eliminated from further consideration. For this criterion, reviewers will rate the bidder's experience and breadth of knowledge in evaporative and exhaust emissions testing, and experience with the off-road equipment

described in the RFP. The bidder should indicate how skills developed in previous related work will be applied. To ensure effective technical contributions and leadership from the principal investigator(s), their combined labor hours should be no less than 10 percent of the total proposed personnel hours.

3. *Availability of facilities for evaporative emissions testing, including evaporative running losses, and dynamometers for simulating engine loads.* (10 points). This criterion has a minimum qualifying score of 8 points; that is, proposals rated below 8 points for this criterion will be considered nonresponsive and will be eliminated from further consideration. For this criterion, reviewers will evaluate, based on availability of facilities and equipment, the bidder's ability to initiate and complete a testing program expeditiously.
4. *Level and quality of effort to be provided, including project management plan* (20 points). This criterion has a minimum qualifying score of 16 points; that is, proposals rated below 16 points for this criterion will be considered nonresponsive and will be eliminated from further consideration. For this criterion, reviewers will evaluate and compare the specifics of each bidder's proposal, relative to those of competitors' proposals. Reviewers will consider at least the following aspects of the proposals: background, credentials, and availability of key personnel and number of hours devoted to each task (individual efforts as well as task totals). Reviewers will address these questions, among others: Is the number of tests and/or simulations to be performed adequate for improving the quality of the statistical correlations drawn? Does the proposal allocate a sufficient number of person-hours at the appropriate levels of expertise to accomplish the objectives of the study?

The project management plan will be evaluated, based on the provisions for project management and oversight, feasibility of the project schedule, planned allocation of resources, proposed methods for measuring project progress against the plan, and proposed methods for detecting and correcting deviations from the planned schedule. This criterion overlaps somewhat with Criterion 1 (Technical approach and workplan), but here the focus is on how the proponent will assemble and

manage resources (e.g., personnel, subcontractor's testing facilities) and how coordination will be achieved. Reviewers will base their ratings on answers to at least these questions: Does the proposal allocate time and resources in such a way that the objectives of the study will be met? Is supervision and oversight adequate for ensuring that the project will remain on schedule? Is the distribution of workload appropriate for activities such as data reduction, computer simulation, analysis, report preparation, meetings, and travel?

5. *QA/QC plan* (10 points). The quality assurance/quality control (QA/QC) plan in the proposal will be evaluated on its ability to provide statistically sound results. Reviewers will consider, among other aspects of quality assurance and quality control, whether the proposal demonstrates the bidder's expertise in assuring the quality of data collected.
6. *Cost* (30 points). This criterion allows staff to evaluate and compare the budgets of each proposal, relative to those of its competitors. If a small business has a technically qualified proposal, its bid will be given a 5 percent preference, as stated in Attachment 2. The technically qualified proposal that has the lowest cost will be given a maximum score of 30 for this criterion. All other technically qualified proposals will be scored in proportion to the lowest-cost proposal, as shown in the example below. The example shows how staff would prorate the score for three bidders with costs of \$250,000, \$275,000, and \$300,000.

#### **Example of Score Proration for Cost Criterion**

Maximum points possible: 30

Bidder A (lowest cost proposal):  $(\$250,000/\$250,000) \times 30 = 30$  points  
Bidder B:  $(\$250,000/\$275,000) \times 30 = 27.3$  points  
Bidder C:  $(\$250,000/\$300,000) \times 30 = 25$  points

## References

- 1) ARB Mailout MSC 99-32, Appendix A - OFFROAD Model Program Structure

## RFP Technical Attachments

### Exhibit A

#### California Phase 2 Gasoline Properties for Gasoline Analyses

##### CALIFORNIA PHASE II GASOLINE SPECIFICATIONS

Octane number [(R+M)/2]	89
Distillation range (°F)	
Initial boiling point	report
10% point	130-150
50% point	190-210
90% point	290-300
End point	390 maximum
Sulfur (ppm)	30 - 40
Reid vapor pressure (psi)	6.7 – 7.0
Olefins (vol%)	4.0 – 5.0
Aromatic hydrocarbons (vol%)	22 – 25
Multi-substituted alkyl-aromatic hydrocarbons (vol%)	12 – 14
Paraffins (vol%)	report
Benzene (vol%)	0.8 – 1.0
Oxygenates [MTBE] (vol%)	10.8 – 11.2
Lead (gram/gallon)	0.05 maximum
Phosphorus (grams/gallon)	0.005 maximum
Deposit control additives (yes/no)	yes
Carbon (wt%)	report
Hydrogen (wt%)	report



Exhibit B  
Example of Equipment Description and Inspection Sheet

Equipment Description

Type (e.g., Lawnmower)	_____
Manufacturer (e.g., Briggs & Stratton)	_____
Model (e.g., Power Built)	_____
Model Year (e.g., 2000)	_____
Power Rating (e.g., 50 HP)	_____
Size of Fuel Tank (e.g., 1 quart)	_____
Material of Fuel Tank (e.g., Plastic)	_____

"As-received" Inspection

Condition (new/old)	_____
Fuel level in fuel tank (e.g., half full)	_____
Visible leakage from joints/fittings/hoses (yes/no)	_____
If yes, describe (e.g., leaking at carburetor connection)	_____
Condition of fuel tank (e.g., new, leaking, etc.)	_____
Fuel tank cap (yes/no)	_____
Location of fuel tank (e.g., 3 inches from engine exhaust manifold)	_____

## Exhibit C

### Example of 24-Hour Diurnal Temperature Profile

<u>Hour</u>	<u>Temperature (degrees F)</u>
1	65.0
2	66.6
3	72.6
4	80.3
5	86.1
6	90.6
7	94.6
8	98.1
9	101.2
10	103.4
11	104.9
12	105.0
13	104.2
14	101.1
15	95.3
16	88.8
17	84.4
18	80.8
19	77.8
20	75.3
21	72.0
22	70.0
23	68.2
24	66.5